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The influence of knee-high medical compression stockings of varying pressures on aortic elastic properties: insightful approach to compression caused systemic effects

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Introduction: There is a strong body of evidence that external compression of both upper and lower extremities increases local blood flow as a result of local arterial vasodilation. However, the effects of medical compression stockings (MCSs) on cardiovascular responses are barely investigated. The present study was designed to assess the effect of MCSs of different compression classes (CCLs) on aortic elastic properties.

Methods: The study comprised 10 volunteers who underwent a complete 2-dimensional transthoracic echocardiographic and Doppler study with blood pressure measurements. All subjects were examined by oscillometric Arteriography device to measure pulse wave velocity, as well. Examinations were performed at baseline and using CCL 1 (18-21 mm Hg), CCL 2 (23-32 mm Hg) and CCL 3 (34-46 mm Hg) MCSs for 20 min consecutively.

Result: Baseline mean Arteriography-derived PWV proved to be 7.86 ± 1.71 m/s, which decreased to 6.55 ± 0.88 m/s using CCL 1 MCS ($p = 0.04$). CCL 2 and 3 MCSs also notably reduced PWV to the value of 6.63 ± 0.65 m/s ($p = 0.058$) and 6.62 ± 1.00 m/s ($p = 0.066$). CCL 3 MCS was able to remarkably diminish baseline echocardiography-derived aortic stiffness index (10.76 ± 8.85 vs. 7.21 ± 3.71 , $p = 0.22$).

Conclusion: The results of this study could suggest that MCSs have a positive influence on aortic elastic properties.